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LECTURE

ON

THE PRODUCTS AND RESOURCES

OF

BRITISH INDIA.

BY

MONTAGUE GORE, ESQ.

DELIVERED BEFORE THE

ST. JAMES'S LITERARY AND PHILOSOPHICAL SOCIETY.

LONDON:

JAMES RIDGWAY, PICCADILLY.

1855.

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LECTURE ON BRITISH INDIA.

THE subject on which I am to address you this evening is, the Productions and Resources of British India ; one which is second to none in importance ; whether we consider the great commercial interests which it affects ; its intimate connection with the future well being of Great Britain ; or, more than all, its influence on the condition of the many millions of human beings in that magnificent Empire ; subject to the sway of England ; and in return for their allegiance entitled to claim, not only protection, but every attention to the promotion of their interests.

In considering the products of that country, the first in importance is, without doubt, its Cotton. When we consider the amount of capital invested in the Cotton manufacture of Great Britain ; and the number of persons employed in, or dependent on it ; the importance of a regular and steady supply of its staple is plain and evident. As a proof of this I need only mention, that it was calculated that the failure of the American crop in the year 1846 caused an advance in price of 2*d.* a pound, and required an increased payment by this country of £4,000,000 sterling.*

* Royle on Culture of Cotton in India, p. 11.

It is, therefore, well deserving of consideration, whether the field from which a supply of it can be obtained, may not be extended.

As regards India the question is twofold—whether the native cotton can be rendered available for the manufactures of England; and whether the American cotton can be cultivated in that country with success.

Cotton is, and has been from a very early period grown over great part of India. It is used by the natives for many purposes; for beds, pillows, cushions, awnings, draperies, quilting, and padding of all kinds, housing of elephants, and halters for horses.

This indigenous cotton is of great use; and is at present largely employed by the manufacturers of this country—that is, to the extent of about 6000 bales per week; but in general it is only fit for low and coarse goods, or is mixed with the American cotton when its supply is defective, and its price high. If the quality of this cotton were improved, there is no doubt that the demand for it would be greatly increased.

The cultivation of the plant might be much improved in some parts of India. In the West indeed it is very good; the drill husbandry is adopted; and the cotton is grown by itself; and not mixed with other plants. The same is the case in Central India; but in the North-Western Provinces, and in Bundelcund and Oude the cultivation is very imperfect.

As compared with American, the native Indian cotton is short in staple or fibre; and is badly cleaned. It is further deteriorated by the nefarious addition of sand, seeds, and other matters, which are mixed with it by the various parties through whose hands it passes, in order to increase its weight. To counteract this no means would be so effectual as the sending well informed European agents into the cotton districts, who might instruct the natives in the proper mode of cleaning the cotton, and impress on them the value of doing so. The importance, too, of dealing directly with the ryots, and getting rid of the Wakarias or middle-men, would be very great. At present there are two middle-men between the Bombay merchants and the ryots; one the monied man of the village, who advances money to the cultivators at an usurious rate of interest; the other the importer into Bombay. Each of these add to their profits, by adding to the weight of the cotton a certain quantity of dirt.

The improvement of internal communications will prove of inestimable advantage. 1st, by facilitating the direct communication between the buyers and the growers; and 2nd, as the means of bringing the cotton to the coast clean and unadulterated, and packed at the plantation ready for transportation, instead of being conveyed, as at present, in loose bags on the backs of bullocks; thrown on the ground every night; and often being

actually buried in the earth as the only means of protecting it during the rainy season.

With regard to the cultivation of American cotton, complete success attended the experiments with it at Dharwar. In 1842, 2,600 acres were sown with it; in 1845, 15,000 acres, when Mr. Mercer thought not less that 1,000,000 lbs. of American cotton would be produced; and this amount was realised. This cotton was of excellent quality, and afforded ample proof that it can be cultivated there with success. In 1849 15,400 acres were planted.*

At Coimbatore, where the climate is less favourable than at Dharwar, considerable success has yet been obtained. Dr. Wight states, "There is abundance of land fit for cotton in the Coimbatore, Tinnivelly, Salem, and Madura districts;" he says that cotton from those districts can be landed in Liverpool for $8\frac{1}{2}d.$ a pound; he has found advantage from irrigation where drought prevailed; and sees nothing to prevent Cotton being as important a crop in Southern India, as Indigo in Bengal.†

In some parts the experiments have failed; but there is no reason to doubt that in Dharwar, Belgaum, Candeish, Coimbatore, and Tinnivelly, American cotton can be cultivated with success, and sold

* Royle on Culture of Cotton in India, p. 100, and letter of Mr. Blount there quoted.

† Royle, on Culture of Cotton, pp. 101-2.

at remunerative prices, at a cost not greater than that of native Indian cotton—that is, about $3\frac{1}{2}d.$ a pound, laid down in Liverpool.

The price realized was never less than this, even when this cotton did not command attention; since that it has often sold for $6d.$, $6\frac{1}{2}d.$, and as much as $7d.$ and $7\frac{1}{2}d.$ *

“The establishment,” says Dr. Royle, “of a few energetic Europeans in different districts, interested in the improvement of cotton in India, is all that is requisite greatly to extend and improve the culture and commerce of cotton of all kinds, in India. I have no doubt that by the importation of foreign, and the selection of native seed; attention to the peculiarities, not only of soils, but of climate; a regard to the course of the seasons, and the temperature, dryness, and moisture of the atmosphere; as well as attention to the mode of cultivation, such as preparing the soil, sowing in lines, so as to facilitate the circulation of air, weeding; ascertaining whether the mixture of other crops with the cotton be injurious or otherwise, pruning, picking the cotton as it ripens, and keeping it clean; great improvement must take place in the quality of the cotton. Experiments may at first be more expensive than the ordinary culture; the natives of India, when taught by example, would adopt the improved processes, as regularly and as easily as the other; and as

* Royle, on Culture of Cotton.

“labour is no where cheaper, any extra outlay
 “ would be repaid fully as profitably as in countries
 “ where the best cottons are at present produced.”*

There is nothing connected with India, which it is of more importance to press on the attention of all who take an interest in its welfare, than the benefits that must result from improving the native, and promoting the growth of American cotton.

Indigo is a natural product of India; the history of its cultivation is singular. At the commencement of our commerce with India, the imports of it thence to England were considerable. It was, however, supplanted for a time by the successful exertions of the British Colonists in the West Indies and the southern parts of North America. But in 1779, the Court of Directors made great exertions to revive it. These exertions have since been continued, and crowned with the happiest success. Large sums are now embarked in its cultivation. It surpasses in quality that of all other countries, and is the chief source of supply to the rest of the world.

I now come to Opium, of which the Company long enjoyed a monopoly, as the Mogul rulers had done before.

When tranquillity was established in Malwa, the cultivation of the poppy which had hitherto been checked by the disorders that prevailed there, considerably increased; and a great export of opium

* Royle, on Culture of Cotton, p. 584.

took place. It was at first attempted to stop this by prohibitory duties; and the native princes were induced to forbid the cultivation of the poppy, and the sale and transit of opium through their states, by receiving compensation for their loss of profits and dues. This, however, occasioned serious evils, paralysing industry, and leading to affrays, and even loss of life, and was as ineffectual as it was unjust. It was at last determined that the conveyance of opium from the parts of Malwa where it is grown to Bombay, should be licensed; a regulation which still continues.

Previous however to our occupation of Scinde, much opium evaded the license duty, being smuggled through that country to Damaun, and Din, and thence carried to China.

Sugar is the next article to which I wish to call your attention. "It is evident," says Dr. Royle, "that every part of the extensive plains of India "is well suited to the cultivation of sugar, but we "do not know what peculiarities of soil and climate "are best suited to produce the richest secretions of "juice, nor which cane is best suited to the different "degrees of dryness, and moisture, heat or cold, of "the different parts of India. The differences in "these respects it would be extremely desirable to "have accurately ascertained."*

The principal Sugar district is near Benares; thence there is a large export by boats up the Jumna

* Royle, on Productive Resources of India, p. 93.

to Culpee, the port of Bundelcund, and the Sangur Territory; to Agra, the port of the Rajpoot States; to Delhi, to Jugadree, the port of the Sikh States, and the Punjab. It is sent on into the interior in carts and on camels. Sir Charles Trevelyan stated in his Evidence before the House of Commons in 1840, that more than 100,000,000 of people derive their supply of sugar from the Valley of the Ganges. The sugar grown there extends beyond the Indies, as far as Russian Tartary, and meets the beet-root sugar manufactured in Russia.*

Tea is cultivated to a great extent all through the North-West Himalayas, on the hills beyond Delhi, and in that direction. A large tract of land is annually sown. It extends from Kumaon into Gharwal.

"The climate of the Himalayas," says Dr. Royle, "is perfectly suitable, as well as the soil, for the cultivation of the best kinds of China tea."†

There is reason to expect that tea may be grown in these districts, and landed in England, as cheaply as tea grown in China.

Land is abundant and cheap, and the tea may be brought down the Ganges or the Indus at less cost than the Chinese convey theirs to the coast.

The cultivation of tea in Assam has also been

* Evidence on East India produce before House of Commons' Committee, 1840, p. 85.

† Evidence before Commons' Committee on Indian Territories, 1853, p. 79.

attended with success. The shrub is indigenous over great part of the country, and the Brahmapootra, which is navigable throughout the year, presents great facilities for its conveyance to the coast. Assam tea at present fetches in the market an higher price than any other.*

I will now speak of the minerals. The valley of the Damoodah which is traversed by the East India Railway, abounds in coal and iron; and the only doubt that has existed as to the practicability of manufacturing malleable iron, arose from the absence of limestone which is requisite to reduce the ore to metal. This however may be imported from Sylhet and other places, and it has been estimated that assuming the cost of railway bars to be £10. per ton, bar iron may be manufactured in the Damoodah valley at least twenty per cent lower than it can be imported from England.†

* The following account of Assam in former times may not be uninteresting here. It was translated by Mr. Vansittart from the work of Mahommed Casim. It describes the country, at least in many places, as "well inhabited, and in excellent state of tillage; "that it presents on every side charming prospects of ploughed fields, harvests, gardens, and groves. As the country is overflowed in the rainy season, an high and broad causeway has been raised for the convenience of travellers from Salageroh to Ghergong, which is the only uncultivated ground to be seen; "each side of this road is planted with shady bamboos, the tops of which meet and are entwined. The silks are excellent and resemble those of China. They are successful in embroidering with flowers, and in weaving velvet, and tautband, which is a species of silk of which they make tents and kenants."

† Williams' Geological Report on Damoodah Valley.

The coal field of the Damoodah valley runs for a considerable distance along both banks of the river of that name, commencing near the junction of the Singharun Nullah, which falls into the Damoodah near the Serampore Indigo Factory. Within the space of country between the rivers Banacar, Adj, and Damoodah, and a line of country generally from four to six miles in breadth, to the south and west of this last river, is the coal field, of great extent, and with little exception full of coal and iron-stone.

The coal varies in quality, but Mr. Homfray, speaking of some of the coal of this district, in the Journal of the Asiatic Society, 1842, says, "It has been found to be the very best description of coal used for steam engines." There is no doubt that the whole of this country is rich in coal and iron.

Mr. Williams above quoted says, "There is no longer any doubt to be entertained respecting the value and importance of the mineral productions of the Damoodah Valley, which has been shown to abound in iron and coal. Admitting that the cost of erection and management of iron works will be greater in this country than in England, there will still be a balance of FORTY SHILLINGS A TON in favour of making iron in India. Independently of the great advantages which would accrue to the railway proprietors, and parties who might feel disposed to embark in an undertaking of this sort; there is no doubt that advantages of a real and substantial character would be realised

“for the Empire, by excavating the iron from our
 “soil, and introducing amongst a numerous labour-
 “ing population, a branch of industry calculated
 “in every way to improve their moral and social
 “condition ; and those faculties which at present
 “appear to be dormant, would by benevolent insti-
 “tutions, coupled with the prospects of getting
 “money for their daily toil, in lieu of a seer or two
 “of rice, be the means of raising the native
 “labourers from that lethargy and indifference so
 “strongly marked on them in Lower Bengal.”

Mr. Williams also gives the following detailed calculation of the expense of the raw materials, and the smelting and refining of the iron, and a statement of the difference of cost between the manufacture in England and India.

For the production of 20,000 tons of bar iron, No. 2, per annum, taking South Wales as the standard in England.

RAW MATERIALS IN SOUTH WALES.

93,600 tons of iron stone at	9s 3d . . .	£42,290
130,000 tons of coal at . . .	4s 6d . . .	29,250
18,500 tons of limestone at	3s . . .	2,770
Total cost		£75,310

RAW MATERIALS IN THE DAMOODAH VALLEY.

93,600 tons of iron stone at	3s . . .	£14,040
130,000 tons of coal at . . .	2s . . .	13,000
18,500 tons of limestone at	2s 7d . . .	23,356
Total cost		£50,396

making a saving in favour of India of £24,914.

Mr. Williams, in this calculation, states only the difference in price of the raw materials, and does not mention that in the price of labour. He also assumes that it will be necessary to employ the limestone of Sylhet as a flux, but recent experiments render it probable that kunker, which is found on the same lands as the iron ores, will answer this purpose.

It appears from the records of the Calcutta Custom House, that 25,000 tons of iron are annually imported into Bengal, wholly independent of what is required for railways. The importance of a supply of native iron may also be judged of from the circumstance, that while all the arrangements in India are completed for making the railway from Calcutta to Delhi in three years, it is found that under ordinary circumstances freight cannot be obtained for the necessary quantity of iron from England under seven years.*

Turning to other parts of India, at Hoshungabad on the Nerbuddah, there is coal of excellent quality, and in abundant quantity. This coal would be a mine of wealth to India, if its carriage were facilitated by the improvement of internal communication.

Again, in the district of Charwar, there is reason to believe that there is abundance of coal, iron, and

* I have heard with pleasure that a company of spirited gentlemen has been formed for the purpose of working the iron field of Damoodah.

limestone. On the banks of the Indus, too, coal has been found of very good quality; excellent coal is also found in considerable quantities in Tenasserim. Iron too, says Helfer, is found ~~there~~ in one or the other form, almost everywhere. The ore found near Tavoy, says Dr. Helfer, would furnish from 74 to 80 per cent of raw iron, and this spot would be very advantageous for works, being only twenty-four miles from the river, which distance might be traversed by a canal or railroad.*

I now come to the Fibrous productions; a subject of the greatest importance, and which has of late attracted great attention, from the apprehension entertained that the war in which we are engaged with Russia may produce a scarcity in the supply of hemp. I am happy to think that instead of this, the war is likely, by directing our attention to other quarters where that article may be obtained, to augment the supply, and to render us independent of Russia.

Hemp is grown with success in various parts of Italy—in Bologna, Romana, on the banks of the Po, and near Naples. This hemp brings the highest price in the English market, selling for 50s per cwt., when best Russian sells at 47s.

By analogy, then, it might be concluded that as Italy grows rice and many other productions of India, India might grow hemp. And we find it

* Vide Thornton's Gazetteer of India, article "Tenasserim."

does grow hemp to a very great extent—the true hemp plant—but which has been principally valued for the narcotic qualities of the sap.

“ In every part of the plains of Bengal,” says Dr. Roxburgh, “ hemp thrives during the cold season. At Soonamooky it did well on a sandy soil, manured with dung from stables.”

Mr. Deneef, a Belgian farmer, who was sent out to India by the London Flax Experimental Society, drew up the following account of the result of his operations, accompanied by a sample of the hemp which he had raised. “ I send,” he says, “ a sample of hemp, which appears to me equal to that of Russia and Manilla, which is sold in London at from £22. to £27. a ton. Its manufacture is very simple, and requires no instrument. The work is done in Belgium by old men and children. The preparation of the soil requires little care and expense; its vegetation is surprising. The plant remains in the ground only 80 days. I have nearly 4 beegars of it, which will yield about 1000 lbs. of fibres. It appears strange,” he adds, “ that India, which has such resources in territory and in men, cannot compete with Russia, which is obliged to pay £2. per ton for charge of exportation to the Russian government itself; and 6s for tonnage at the passage of the Sound; and cannot obtain for herself some of the large sums which she pays annually to Russia, her powerful rival.” The hemp thus easily produced, was pro-

nounced of excellent quality by the members of the Hemp and Flax Committee.

Hemp will grow to a great extent in the plains of India. It has been cultivated in the Botanic Garden at Saharunpore, and attained an height of nearly 12 feet. But there are some doubts if it is as strong and flexible as that grown in the Himalayas. Hemp, of very good quality, and of which I have a sample in my possession, has been produced at Jubbulpore. It required 190 lbs. to break Jubbulpore hemp, whilst that from Petersburg broke at 160 lbs.

There is no doubt that the Ganja of the Himalayas is the true hemp plant of Europe. In the Himalayas it grows wild, and is also carefully cultivated. Of the fibre, the hill-men make rope and twine, &c. All along the Himalaya mountains—that is, in Nepaul, Kumaon, Guzerat, and up to the newly-acquired hills of the Punjab—hemp is cultivated. The quality of this hemp is excellent. Mr. Hodgkinson, a Calcutta merchant, well acquainted with this staple and that of Russia, says:—"It is equal in colour, cleanness, length, and strength, to the best Russian." Some of it has borne a greater pressure in this country than the best Petersburg.*

But it is not only the hemp; but the grasses, sedges, and other productions of India, offer materials for cordage, and various purposes. From some of these paper can be made.

* Royle, on Fibrous Plants of India, p. 327-9.

The plantain deserves especial notice. This beautiful tree is of inestimable value in many respects. It is said to yield from the same extent of ground a larger supply of food than any other plant. According to Humboldt, the same space of a thousand square feet, which will yield only 462 lbs. of potatoes, or 38 lbs. of wheat, will produce 4000 lbs. of plantains, and in a shorter time. The fibre, too, of the plantain, is fit for paper making of almost every quality.

The silk districts of India are chiefly on the banks of the Ganges, within the tract of inundation. The mode of culture of silk requires great improvement, although the trade in it is now so profitable, that there are many rich natives in the silk districts who have made their fortune by it. The cocoons that grow in India are inferior to those of China and Italy. Most of the culture, too, is from shoots, and not from trees, as in Europe. The reason assigned for this by Mr. Rogers, in his evidence before the House of Commons in 1840, was, "that the mulberry shrub is much more prolific in India than as a tree; and shoots out three or four times a year; but the principal cause is, that any poor cotter may plant his little half begah, and feed a number of worms on it, when he cannot grow a tree."*

One great detriment to the quality of the Bengal

* Evidence before Commons' Committee on East India Produce, 1840, p. 308.

silk is the defective winding of the finer medium sorts. Some good parcels of silk arrive from India, and command full prices ; but unfortunately, as long as there is such a competition for silk in Calcutta, *without reference to faults*, the reelers have not much inducement to improve it.

In Assam, silk is being produced on high lands, and the experiment of producing it on them is being tried in other parts.

It requires nothing but the application of capital, and the diffusion of information as to the best mode of culture, to render the growth of silk in India of great value. Some samples sent home a few years ago by Mr. Rose and Mr. Lauraletto were pronounced by the Society of Arts to be equal in quality to the Italian ; and India has this advantage, that production never ceases ; there are three or four crops in the year, instead of one, as in Italy.

Mr. Rogers, above referred to, said, in his evidence, "The supply of silk that we are capable of producing in India can only be limited by the demand ; we are capable of producing any quantity that is required for the country, or for the world, if we had capital."*

The forests of Timber in India are extensive and valuable. Dr. Wallich, in his report, particularly

* Evidence before Commons' Committee on East India Produce, 1840, p. 310.

alluded to those in the islands of the Gogra as being very valuable.

Dr. Wallich pressed on the Government the necessity of interfering in the management of these and other forests, as the natives cart and carry off plants of all kinds without planting fresh ones; nor have they any regular system of seasoning timber.

The mountain tracts of Malabar are covered with magnificent trees, especially teak. Some years ago, owing to the demand for this timber, fears were entertained that the woods would become exhausted.

Teak plantations were, therefore, extensively planted by order of the Government.

In the latter part of 1843, and the spring of the following year, 50,000 young trees were planted. In a report on this subject, in the fourth number of the Journal of the Royal Asiatic Society, 120 valuable sorts of timber are enumerated as produced in Malabar. Some trees are of vast size, having been found on measurement 45 feet in circumference, upwards of 120 feet high, and 60 feet without a branch.

Teak has been felled measuring 7 feet in diameter, at the lower end, and 20 inches at the height of 60 feet. The peon or puna, a light and strong tree, is fit for masts, and has been cut 95 feet in length and 3 feet in diameter. This wood is as light as Riga timber, while it is stronger and more durable.

In Arracan there are forests of oak and teak; bamboos abound; and various other kinds of trees. The mountains of Tenasserim, also, are clothed from base to summit with thick forests and brushwood.*

India produces a great variety of trees of all kinds; and a large collection of Indian woods may be seen in the Museum of the India House. The mahogany tree answers very well in Bengal, and so far back as 1814, Dr. Carey stated that many thousands of it were growing there.

It would be impossible within the limits of this lecture to point out all the manifold productions of this noble country. The pepper plant thrives in Malabar; emphatically styled the money of that district. The cocoa-nut tree is very extensively raised in some parts of the country; dyes too of various kinds; vegetable oils and fats are generally diffused.

In some of the mountainous districts there are numerous flocks of sheep; and to ensure a valuable traffic in wool it is only requisite that the natives should be instructed in better packing and pressing it.

I will now say a few words on our recently acquired Territories of the Punjab and Scinde.

In speaking of the Punjab I cannot refrain from quoting the following observations of the Court of Directors:—"In the short period which has elapsed "since the Punjab became a part of the British

* Thornton's Gazetteer of India.

“dominions; results have been achieved such as
 “could scarcely have been hoped for, as the reward
 “of many years of well-directed exertions. The
 “formidable army which it had required so many
 “battles to subdue has been quietly disbanded,
 “and the turbulent soldiery have settled in indus-
 “trious pursuits. Peace and security reign through-
 “out the country, and the amount of crime is as
 “small as in our best administered territories.
 “Justice has been made accessible without costly
 “formalities to the whole population. Industry
 “and commerce have been set free. A great mass
 “of burthensome and oppressive taxation has been
 “abolished. Money rents have been substituted
 “for payments in kind, and a settlement of the land
 “revenue has been completed in nearly the whole
 “country, at a considerable reduction of the former
 “amount. In the settlement the best lights of
 “recent experience have been turned to the utmost
 “account, and the various errors committed in a
 “more imperfect state of our knowledge of India,
 “have been carefully avoided. Cultivation has
 “already largely increased. Notwithstanding the
 “great sacrifices of revenue, there was a surplus,
 “after defraying the civil and the local military
 “expenses, of 52 lacs in the first; and 64½ lacs in
 “the second year after annexation.”*

* Report on Administration of the Punjab, 1849-50 and 1850-1.

The Punjab proper is divided into four natural sections called *doabs*. The aspect of these varies much. In the centres of them are wastes, overgrown with grass and bushes—yet the ruins of cities, villages, and water-courses show that this region was once flourishing; and even now it is of great value. It yields large supplies of firewood, and of grass for equestrian establishments; it sustains a noble breed of cattle; buffaloes, sheep, and goats; and its grazing grounds support the camels so essential for the Cabul traffic.

But if we quit the centres of the doabs and travel down the river sides, the scene changes. There we meet with a country rich and fertile; the streams spread wealth and fruitfulness around; and the banks enriched with alluvial deposits, are fringed with the finest cultivation. The soil maintains two waving harvests annually; and the sight of well-peopled villages, the abodes of an happy and industrious peasantry, gladdens the traveller's heart.*

I have been speaking of the Punjab proper, let me now call your attention to the Trans-Sutlej States, which are generally considered part of the Punjab, and are placed under one administration with the rest; although their management is in some respects different. They may be divided into, first—the Alpine region of Kangra; a succession of hills and valleys, irrigated by the torrents which

* General Report on the Administration of the Punjab, 1849-50 and 1850-1.

flow down from the higher grounds in countless channels. Three harvests annually crown the labours of the husbandman; the rice is the finest in Upper India, and many parts are covered with magnificent forests of timber-trees.

The other portion of these States is the champagne country of the Jullundur-Doab, a district surpassed indeed by particular localities of other doabs, although in none is the fertility so regularly unbroken.

Scinde was neglected by the Ameers; but the previous rulers appear to have attended to the improvement of the country. There are traces of old canals and water-courses, and not only that, but evidence exists in some places that dams had been made, and reservoirs formed, to secure the water of the Indus when it overflowed; and to render it available for purposes of cultivation. Remains of old towns are met with, and of cemeteries; and fragments of bricks and pottery.

In some parts of Scinde there are two harvests; the spring harvest reaped from seed sown in autumn, consisting of wheat, barley, oil, seed, millet, opium, hemp and tobacco; the autumn harvest reaped from seed sown in spring, and consisting of rice, cotton, indigo and maize. Rice thrives remarkably, and there is every reason to suppose that flax will do well. Its prosperity depends much on irrigation, and the navigation of the Indus.

There is now on this river regular communication

between Kurrachée at its mouth and Moultan ; and it is probable that this will be extended as far as Kalabagh. There seems every reason to expect considerable traffic on it ; many natives go in the steamboats in preference to travelling by the kafilas. From the country bordering on the upper parts of the river, a great trade may be expected in wool.

The Chenaab, a tributary of the Indus, is navigable as far as Viseerabad, from about the 20th of May, till the beginning of August, but it is not safe for vessels to stay high up the river later, as it often falls at that time.

The Jelum is also navigable to a considerable height, and is a finer river than the Chenaab.

The following extract from a letter of the late Sir Charles Napier, shows the commerce that may be expected to flow in this direction ; and his remarks are especially interesting at the present moment, when we are engaged in a war with Russia.

“ In the North there runs from east to west the
 “ great line of traffic between China and Russia,
 “ which renders Russian manufactures in the North
 “ of India *cheaper than British manufactures* ; that
 “ line passes through Leh or Ladak, in Thibet ;
 “ which, by the map, is 250 miles north of
 “ Simla. The Chenaab is a tributary river to the
 “ Indus, and runs from within 100 miles of Ladak.
 “ We may hope then that the China trade, now
 “ passing through Ladak, will flow down to India ;
 “ following the course of the five rivers of the Pun-

“jab ; for the devil is in the dice, if England with
 “ water carriage the whole way from Liverpool to
 “ within 100 miles of Ladak, cannot win the China
 “ trade from Russia. Ladak is assuredly the field
 “ of battle for a commercial contest with Russia.
 “ In military terms, our line of operations, with
 “ India for our base, is short, easy, safe. That of
 “ Russia, long, difficult and unsafe ; our line passing
 “ altogether through our own territories ; while that
 “ of Russia passes through the most barbarous
 “ countries altogether beyond her control.

“ Our goods will indeed reach Ladak charged
 “ with their portion of the National Debt, but
 “ Russian goods go there charged with a heavy
 “ black mail levied by wild robber tribes at every
 “ step, which would destroy the trade altogether, if
 “ the caravans did not themselves pillage. This is
 “ asserted by those with whom I have conversed on
 “ the subject ; men who have a knowledge of those
 “ countries, and have travelled with the kafilas and
 “ caravans.”*

* Sir Charles Napier placed some steamers on the Indus, when Governor of Scinde, and in the letter from which I quoted, offers the following suggestions for the improvement of trade.

“ 1st. Cut the bar at the entrance of Kurrachee Harbour. It
 “ is only decayed rock, and not an alluvial deposit, and the water
 “ will assist the engineers, for the decayed rock, when loosened
 “ by art, will be washed away by the tides.

“ 2nd. Take all scientific measures to clear and deepen the
 “ harbour.

“ 3rd. Lay water pipes from the Mullerie river to Kurrachee.

The seaport of Kurrachee at the mouth of the Indus is of very great importance. It has been called *the Gate of Central Asia*. Experiments have been authorised for the purpose of ascertaining how far it is practicable to remove the bar at the entrance of the harbour, and otherwise to deepen it.

A fair has been established there which promises to be very successful. The native exports are camels, saltpetre, salt, rice, and other grain, ghee or clarified butter, hides, tallow, oil, oil seeds, fish, bark for tanning, alkalies, indigo, cotton. The transit exports from the adjoining countries are assafoetida and various other drugs, madder and other dyes, alum, wool, silk, Kashmir shawls, dried fruits, lapis lazuli, gems of various kinds, the precious metals, and horses. The imports are metals, hardware, cottons and silks, twist and yarn.

The railway about to be formed in Scinde will contribute most materially to develop its resources.

Nothing will conduce more to the prosperity of India, than the works of irrigation which have been made, or are in the course of completion, in various parts of the country.

“ The surveys, levels, estimates, were all taken by me, and are
 “ ready for application, the cost will be only £12,000. according
 “ to the estimate made for me by Lieutenant-Colonel Scott. From
 “ the reservoir thus formed at Kurrachee pipes should be laid
 “ along the key or ‘bund’ by Kumara point for conveying water
 “ to the shipping.

“ 4th. Form a key at the mouth of the tide creek at Gisree.

“ 5th. Make a railway from Kurrachee to Gisree, three miles.”

In the North-western Provinces the Western Jumna or Delhi Canal extends from the foot of the hills to Delhi and Hissar. Its total length is 425 miles. It is spanned by 159 masonry bridges, 54 of wood work, and one suspension bridge; and there are nearly 700 irrigation outlets from the main channel. "This canal," says Lieutenant Baird Smith, "has almost called into being an active, contented, and prosperous peasantry, in the once sterile district of Hissar, the chief towns of which were found in 1807 to be literally without an inhabitant."

The Eastern Jumna Canal extends about 155 miles. "Most beautiful," says the author just quoted, "it truly is, with its broad road smooth as an English lawn, its double rows of trees drooping over the stream, its long graceful sweeps, its rich borderings of the most luxuriant crops, its neat station houses, and the peculiar care with which all its works are maintained. It is certainly one of the most interesting and attractive of Indian sights. The gem of the whole is the southern division, where, for nearly sixty miles, the visitor passes through a country which is the garden of the north-west, and finds constant cause to admire the beautiful, although limited scenes which every turn of the canal brings before him."

In speaking of the Ganges Canal, I must in justice mention the praise that is due to Lord Hardinge for the sanction which he gave it in its early

stages, and the vigour with which he promoted it. This noble work traverses with its several branches more than 800 miles. It secures from injury in famine seasons

250,000 acres of sugar and indigo ;

125,000 acres of cotton ;

375,000 acres of rice and sundries ;

750,000 acres of wheat, barley, &c.

Total . . 1,500,000*

The total increase of the value of the produce of land due to the existence of the canal is estimated at £1,200,000. per annum, a sum nearly equal to the total capital invested in it ; and after paying for repairs and increased establishments it will yield an annual surplus of £350,000.—more than twenty per cent on the capital invested.

In the Punjab the Baree Doab Canal promises to be most important in its effects, and in Madras the Cauvery Amicut and the works on the Godavery and Kistnah rivers yield large returns. The revenue from many of the canals of irrigation in this Presidency exceeds Rs.5000 a mile, and in few or none of the larger class does it fall so low as Rs.1500. a mile.†

The improvement of internal communications cannot fail to exercise an important influence on

* History of the Administration of the East India Company, by Kaye.

† Report on Public Works in Bengal, 1853.

the development of the resources of this country. Amongst these means of communication, railways deserve especial notice; and none more so than the East Indian Railway, which it is proposed to extend from Calcutta, by the valley of the Ganges, to the North-west provinces, and part of which is already completed. This line opens the Damoodah coal field; then proceeding to Rajmahl, will give facilities for the carriage of the produce of the districts on the left bank of the Ganges; going on to Allahabad, it will skirt the hilly tracts, which are said to be replete with mineral wealth; will open out the Opium districts; and meet the trade of the Nerbudda valley at Mirzapore.

“ Beyond Allahabad it will run along the entire
 “ Doab, skirting the frontiers of Oude, whose great
 “ fertility and natural resources may one day con-
 “ tribute largely to the traffic of the line. It will
 “ traverse the country beyond Cawnpore, which
 “ fruitful already, will shortly become more so,
 “ under the influence of the Ganges Canal, whose
 “ opening is looked for in 1854.* It may receive,
 “ whenever it is desired, a branch by Furruckabad,
 “ for the conveyance of the produce of Rohilcund;
 “ and it will be equally accessible to such other
 “ branches as either the Honourable Company or
 “ native princes may desire to lead from it into the
 “ districts on the other side.

“ And although the country beyond Delhi is, at

* This canal is now opened.

“ the present time, less productive and less populous
 “ than the districts below, no man who has noted
 “ the effect which even four years of peace have
 “ had upon the face of the country beyond the
 “ Sutlej, or who is aware of the vast results which
 “ the providing of the means of irrigation produces
 “ upon the cultivation and the peopling of similar
 “ districts in India, will entertain a doubt of the
 “ certain success of those great irrigation works
 “ which are already commenced in the Baree
 “ Doab, and are contemplated in the Cis-Sutlej
 “ province; or of their rendering the districts
 “ beyond the Doab at no distant date, as populous
 “ and as productive as those within it.”*

The returns of this line are a complete answer to those who apprehended that there would not be much passenger traffic on the Indian railways. Taking 24 weeks, from the 2nd of December to the 12th of May, we find that in the first 9 weeks of that period, when the line was opened for $37\frac{1}{2}$ miles only, the aggregate number of passengers carried was 71,921, or an average of 7,991 per week. During the next fifteen weeks after the line had been opened for 121 miles, the aggregate number of passengers carried was 179,404, or an average of 11,960 per week.

Again, the Baroda and Central India Railway will be important as the means of intercourse between Agra and Bombay, running through a

* Minute of Lord Dalhousie on Railways, 1853.

country rich in cotton, opium, and salt, and forming the most direct line for carrying British and Indian produce towards Thibet and China. Other lines of great importance are proposed, and I cannot better close my remarks on this occasion than by quoting the concluding paragraph of the Minute of Lord Dalhousie, in which he expresses his earnest hope “ that the Honorable Court of Directors will resolve “ at once to engage in the introduction of a system “ of railways into the Indian Empire, upon a scale “ commensurate with the magnitude of the interests “ that are involved ; and with the vast and various “ benefits, political, commercial, and social, which “ that great measure of public improvement would “ unquestionably produce.”*

The improvement of river navigation is another point well deserving of attention. If we look at the map of India, we see the country intersected by streams flowing through some of the most fertile districts, and which seemed designed by nature as arteries for conveying and circulating the natural resources of the country. There is, however, considerable difficulty in their navigation, owing to their shallowness at some periods of the year, and to the sandy and shifting nature of their beds. But the returns of the steamers which at present navigate the Ganges are considerable, and there is every reason to suppose might be greatly increased. The

* Correspondence on Indian Railways, ordered by House of Commons to be printed, 1853.

Brahmapootra is also navigable to a great height, and I have already spoken of the capabilities of the Indus.

The Godavery would, if rendered navigable, afford a commodious outlet for the cotton and other produce of Berar. It flows a course of 700 miles, and its main tributary, the Wurdah, passes through the extensive cotton districts of Nagpore. If the river were opened, the cotton marts of Oomrawutty and Chandah would be at once placed in immediate communication with the manufacturers of Lancashire, and it would also open the whole market of those extensive regions to the rice of the Godavery Delta and to the salt of the coast.* The soil of Berar might then be entirely devoted to the growth of cotton, whilst the grain of the Godavery and Kistnah Deltas would be carried up the stream to feed its population. "The opening of this river " may," says Colonel Cotton, on the most moderate calculation, "raise the sale of cotton and wheat " grown in Berar to the amount of 1,000,000 " sterling ; of rice and salt produced in Rajah " mundry, to half that amount ; and of English " manufactured goods of the value of another half " million."†

* Return Public Works Bengal, p. 169.

† Public Works in India, by Lieutenant-Colonel A. Cotton, p. 74. A valuable Report on the Improvement of the river Ohio, presented to the War Department of the American Government,

Although the sandy bed of the Godavery shifts, it does so very gradually, which circumstance and published in the Executive Documents of the Senate, contains some remarks which may not be inapplicable to the subject of Indian river navigation. "By observing," says Mr. Ellet, "the descent of the Alleghany from Franklin to Pittsburg, we may conclude that rivers, of which the fall does not exceed two feet per mile, are navigable for steamboats, unless there be great irregularity in the distribution of that fall. In the event of such irregularity existing, rivers having an average descent not exceeding two feet per mile, if well supplied with water, must afford exceedingly good navigation between the rapids, which must be very remote and easily overcome.

"We learn, also, from these tables, that a descent of nearly *four feet per mile* is not incompatible with the existence of steamboat navigation, if the supply of water be well maintained; for a steamboat has ascended the Alleghany as far as Olean Point, overcoming in places a slope of nearly five feet per mile."

Some of the American rivers, like those in India, are at times so low as to render them difficult of navigation, whilst at others they overflow their banks to a considerable extent. To meet these evils, Mr. Ellet proposed to make reservoirs, into which the superabundant waters might be directed at times of floods, and retained until they were required to feed the rivers at periods of drought. "It is not, however," he says, "intended to recommend the application of this mode of improvement to all streams. It is only those rivers, or parts of rivers, on which the imperfections of the channel are caused essentially by a deficiency of water in seasons of drought, and not by the rapidity of their fall, or obstruction in their beds, that are susceptible of this mode of improvement. Rivers which—like the Ohio, Alleghany, Cumberland, and Tennessee—are always navigable when there is sufficient water in their channels to float the boats freely, but of which the navigation fails because the supply of water fails,

much facilitates the pilotage of vessels. Much of course will depend on the construction of boats employed in this and other rivers. Those at present on the Ganges are said to be well adapted to it. Mr. Bourne also proposed some years ago to construct a vessel capable of carrying a heavy cargo on a very small draught of water. I would suggest that a premium should be offered for the boats best adapted to navigate these rivers.

In conclusion, I will only observe, that I should be sorry to give birth to any hopes that may not be realised, or to encourage expectations, the failure of which would only tend to blight and retard future enterprise. The growth of commerce, to be healthy, must be gradual.

But I can conceive few more noble objects of human ambition, and no subject more deserving the attention of all who take an interest in the future destinies of Great Britain, than the developing those resources of which in this lecture I have given a faint and imperfect outline.

New supplies of materials for our manufactures

“ and on which lakes may be formed at small expense, without
 “ injury to valuable property or to the salubrity of the country ;
 “ such rivers as these can be best, most cheaply, permanently,
 “ and effectually improved, by collecting a portion of the waters
 “ which are wasted in producing floods, and holding them in
 “ store for the season when the sources of supply fail to render
 “ their customary tribute to the channel.”

may thus be insured ; new marts be opened for the products of British industry. Nor is this all. The plough is the pioneer of civilization. The minds of the natives of India will be raised and purified as their physical condition is improved ; the tranquil arts, the social enjoyments, of civilized life will follow in the train of science ; and we may entertain the hope, as we must all join in the prayer, that the mists of superstition and spiritual darkness in which so extensive a part of the globe has been long enshrouded may be dispelled by the hallowing rays of Christianity.

What nobler destiny can the fondest patriot desire for his country, than that for her it should be reserved, to dispense such blessings temporal and spiritual to so large a portion of the human race !

The increase of production in India is closely connected with the question of remittances to this country, and may exercise an important influence on Indian Finance. The following were the opinions expressed on this subject in 1848, by that excellent and able man, the late Mr. St. George Tucker:—

“It will be readily admitted that the annual tribute from India, amounting to from £3,700,000 to £4,000,000, can only be remitted by means of the export trade from that country; in other words, India can only pay her public debt by her produce and manufactures, exported either directly to the mother country, or indirectly through China and other countries having commercial relations with Great Britain.

“But the public tribute is not all which India has to pay. The private fortunes which Europeans acquire in that country must also be remitted, sooner or later; and they may be roughly estimated at half a million sterling, on an average of years. India must further pay for her annual imports from Europe and other quarters, which cannot be estimated at less than £3,000,000, or £4,000,000; so that a remittance, by means of her produce and manufactures, is annually required, to the extent of not less than eight millions sterling.”

“There are two important objects which should engross our earnest attention.

“The primary one is, to realise a surplus revenue in India sufficient to meet the home expenditure and the other demands of the service ; and this object has not yet been accomplished, although much has been done to effect a reduction in the military and other charges of our Indian Governments.

“The other, and more immediate object is, to promote, as far as possible, the means of effecting the remittance of that surplus to England ; and this can only be done by encouraging and extending the agriculture, the manufactures, and the external commerce of the country.”

“Much has been done by the Court to improve and extend the cultivation of cotton in our Indian territory ; and this national object will, I trust, sooner or later be accomplished ; but we have not yet been able to compete successfully with the United States in the production of the article. Still, I look to it ultimately not only as a valuable source of supply to our manufactures, but as a fruitful source of remittance from India to this country.”*

* Memorials of Indian Government ; being a Selection from the Papers of Henry St. George Tucker, late Director of the East India Company ; edited by John William Kaye.

the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million (from 2.5 million in 1980 to 4 million in 1998). The public sector has become a major employer in the UK, and this has implications for the way in which the public sector is managed and the way in which it is funded.

The public sector is a complex organisation, and it is difficult to understand how it works. The public sector is made up of many different organisations, each of which has its own role to play. The public sector is also a major employer in the UK, and this has implications for the way in which the public sector is managed and the way in which it is funded.

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